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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/749,579	12/30/2003	Henley Quadling	12075/20	8994
757	7590	02/28/2006	EXAMINER	
BRINKS HOFER GILSON & LIONE			STOCK JR, GORDON J	
P.O. BOX 10395			ART UNIT	
CHICAGO, IL 60610			PAPER NUMBER	
			2877	

DATE MAILED: 02/28/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/749,579	Applicant(s) QUADLING ET AL.	
	Examiner Gordon J. Stock	Art Unit 2877	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 February 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 December 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>20050222;20040624</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Information Disclosure Statement

1. The information disclosure statements (IDS) submitted on June 24, 2004 and February 22, 2005 are being considered by the examiner.

Drawings and Specification

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the collimating optics of claim 1 and the collimating means of claim 13 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

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3. The drawings and specification are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: R of Fig. 2a. Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

4. The specification is objected to for the following: on line 4 of paragraph 0029 on page 7 "232" should read -222-. Correction is required.

Claim Objections

5. **Claim 8** is objected to for the following: **claim 8** is improperly dependent upon itself. Examiner is interpreting the claim as being depending from **claim 6**. Correction is required.

6. **Claim 13** is objected to for the following: on line 5, "to be images" should read -to be imaged-; on line 6 "the a focused" should read -the focused-. Corrections required.

7. **Claim 14** is objected to for the following: "the dot" and "the scanning means" lack antecedent basis. Correction is required. Examiner has interpreted this claim as depending from **claim 13**.

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8. **Claim 15** is objected to for the following: “the image capturing means” lacks antecedent basis. Examiner has interpreted this claim as depending from **claim 13**.

9. **Claim 18** is objected to for the following: “the lens” lacks antecedent basis. Correction is required.

Claim Rejections - 35 USC § 102

10. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

11. **Claims 1-2, 9, 11, 13-15** are rejected under 35 U.S.C. 102(b) as being anticipated by **Wenz (US 5,440,393 A)—cited by applicant.**

As for **claims 1-2, 9, 11, 13-15**, Wenz in a dental imager discloses the following: a light source having collimating optics, means for generating a collimated laser beam of light (column 3, lines 40-55; column 9, lines 45-60); a scanner optically coupled to the light source and configured to scan the collimated beam along at least two axes, scanner means (column 9, lines 20-30); an optics relay coupled to the scanner and configured to relay the scanned, collimated beam towards a remote object to be imaged; thereby, having beam focusing means (Fig. 1: 94, 90, 18, 20); an image capturing instrument having an optical axis at an angle with respect to the scanner configured to detect a reflection of the scanned beam from the object and to generate data representative of a surface of the object based on the reflected beam; thereby, having image capturing means (Fig. 1: 104, 108); a processor coupled to the scanner and the image capture system configured to generate a three-dimensional image of the object based on the data;

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thereby, having processing means (column 8, lines 40-45); the light source is a laser LED (column 8, line 10); the scanner comprises a plurality of mirrors (column 8, lines 25-30) that are orthogonal to each other (Fig. 1: 12, 14); where the scanner further comprises a programmable position controller configured to control the scan of the collimated beam (column 4, lines 45-55); whereby, the scanning means scans the beam across the object in a selected pattern via beam focusing means (column 11, lines 35-67); , he discloses an image sensor and an imaging lens system (Fig. 1: 108, 104, 92, 18, 20) wherein, triangulation is used with strip like patterns (column 6, lines 30-36) comprising laser beam spots (Figs. 4a-4b).

Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

13. **Claim 3** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Wenz (US 5,440,393 A)**-cited by applicant in view of **Galbraith (5,168,386)**.

As for **claim 3**, Wenz discloses everything as above (see **claim 1**). He is silent concerning a flat-field scan lens having an optical axis and configured to focus the scanned beam to a point on the object. He does disclose a scanner optically coupled to the light source and configured to scan the collimated beam along at least two axes, scanner means (column 9, lines 20-30). And Galbraith in a telecentric scanner teaches using a flat field scan lens to correct for field curvature during scanning (col. 1, lines 55-65). Therefore, it would be obvious to one of

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ordinary skill in the art at the time the invention was made to have a flat field scan lens in order to correct for field curvature during scanning.

14. **Claim 4** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Wenz (US 5,440,393 A)-cited by applicant** in view of **Galbraith (5,168,386)** further in view of **Choate (5,832,107)** and **Ernst (US 6,402,707 B1)-cited by applicant**.

As for **claim 4**, Wenz in view of Galbraith discloses everything as above (see **claim 3**). In addition, he discloses an image sensor and an imaging lens system (Fig. 1: 108, 104, 92, 18, 20); the object is an in vivo dental item (Figure 7); wherein, triangulation is used with strip like patterns (column 6, lines 30-36). He is silent concerning a plurality of parallel curves as the pattern. However, Ernst in a dental imager teaches using curvilinear coordinates with a variety of patterns (column 12, lines 30-45; column 16, lines 20-45). Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was made to have a plurality of curves as a pattern in order to form a three-dimensional image via a curvilinear coordinate system. As for a telecentric lens Wenz is silent. He does disclose two stereoscopic lenses (Fig. 1: 92, 94). However, Choate in a stereoscopic system telecentric lenses for measuring dimensions of objects (col. 6, lines 1-15). Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was made to have the system comprise telecentric lenses in order to provide stereoscopic images for measuring the dimensions of the buccal cavity.

15. **Claim 5** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Wenz (US 5,440,393 A)-cited by applicant** in view of **Galbraith (5,168,386)** further in view of **Choate (5,832,107)** and **Ernst (US 6,402,707 B1)-cited by applicant** further in view of **Ozeki et al. (5,280,542)**.

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As for **claim 5**, Wenz in view of Galbraith, Choate, and Ernst discloses everything as above (see **claim 4**). In addition, Wenz is silent concerning an object positioning means configured to position the object within a field of projection of the scanner. However, Ernst in a dental imager teaches having a global positioning means to register the oral cavity in order to properly image in three dimensional space (col. 14, lines 60-67; col. 15, lines 1-30). Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was made to have a object positioning means to properly register the object being measured with respect to the imaging system for three dimensional imaging.

Wenz does not explicitly state merging images but horizontal and vertical images are recorded (column 9, lines 20-30). And Ozeki in an xyz coordinate measuring system teaches merging vertical image and horizontal image data to derive three dimensional coordinates (col. 10, lines 38-67; col. 11, 1-4). Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was made to merge the horizontal and vertical images in order to determine three dimensional coordinates for the three dimensional image of the cavity.

16. **Claims 6 and 8** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Wenz (US 5,440,393 A)**-cited by applicant in view of **Galbraith (5,168,386)** further in view of **Choate (5,832,107)** and **Ernst (US 6,402,707 B1)**-cited by applicant further in view of **Mushabac (5,545,039)**—cited by applicant.

As for **claims 6 and 8**, Wenz in view of Galbraith, Choate, and Ernst discloses everything as above (see **claim 5**). As for the object being a dental casting Wenz is silent. However, Ernst discloses that the oral cavity comprises removable, detachable dentition castings (col. 11, lines 4-20). Therefore, it would be obvious to one of ordinary skill in the art at the time

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the invention was made to have the system image a dental casting in order to properly image a buccal cavity that comprises both teeth and dental prostheses. As for the object positioning system being configured to move the object to various positions and angles with respect to a field of view of the image sensor instrument and scanner, Wenz is silent. However, Ernst does mention removable, detachable dentition castings in the oral cavity (col. 11, lines 4-20). And Mushabac teaches object positioning system configured to move objects to assist the dentist in shaping and placement of the object within the patient's mouth (Fig. 13; Fig. 37: 642; Fig. 38: 656). Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was made to have a positioning system configured to move the object into various positions to aid the dentist in proper placement of the object in the patient's mouth.

17. **Claim 7** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Wenz (US 5,440,393 A)-cited by applicant** in view of **Galbraith (5,168,386)** further in view of **Choate (5,832,107)** and **Ernst (US 6,402,707 B1)-cited by applicant** further in view of **Mushabac (5,545,039)—cited by applicant** further in view of **Ozeki et al. (5,280,542)**.

As for **claim 7**, Wenz in view of Galbraith, Choate, Ernst, and Mushabac discloses everything as above (see claim 6). Wenz does not explicitly state merging images but horizontal and vertical images are recorded (column 9, lines 20-30). And Ozeki in an xyz coordinate measuring system teaches merging vertical image and horizontal image data to derive three dimensional coordinates (col. 10, lines 38-67; col. 11, 1-4). Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was made to merge the horizontal and vertical images in order to determine three dimensional coordinates for the three dimensional image of the cavity.

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projection of the scanner. However, Ernst in a dental imager teaches having a global positioning means to register the oral cavity in order to properly image in three dimensional space (col. 14, lines 60-67; col. 15, lines 1-30). Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was made to have a object positioning means to properly register the object being measured with respect to the imaging system for three dimensional imaging.

As for **claims 17-18, and 20**, Wenz discloses in a dental imager the following: a light source having collimating optics, means for generating a collimated laser beam of light (column 3, lines 40-55; column 9, lines 45-60); a scanner optically coupled to the light source and configured to scan the collimated beam along at least two axes that are perpendicular to each other horizontally and vertically, scanner means (column 9, lines 20-30); a focusing optics relay coupled to the scanner and configured to focus the scanned, collimated beam towards a remote object to be imaged; thereby, having beam focusing means (Fig. 1: 94, 90, 18, 20); an image capturing system configured to detect a reflection of the scanned beam from the object and to generate data representative of a surface of the object based on the reflected beam; thereby, having image capturing means (Fig. 1: 104, 108); a processor coupled to the scanner and the image optics system configured to generate a three-dimensional image of the object based on the data; thereby, having processing means that determine a map of the surface of the object, the which is a dental item in an oral cavity (column 8, lines 40-45; Figure 7); wherein, the object is positioned initially for imaging by positioning the buccal cavity (Figs. 7 and 9); wherein, triangulation is used with strip like patterns (column 6, lines 30-36). He is silent concerning a plurality of parallel curves as the pattern that are curvilinear. However, Ernst in a dental imager teaches using curvilinear coordinates with a variety of patterns (column 12, lines 30-45; column

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18. **Claim 10** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Wenz (US 5,440,393 A)-cited by applicant.**

As for **claim 10**, Wenz discloses everything as above (see **claim 1**) and discloses a plurality of movable mirrors (column 8, lines 25-30). He is silent concerning a rotatable mirror and a spinning polygon mirror. However, it is well-known that galvano-mirrors are used in scanning in a linear fashion and spinning polygon mirrors are known for imaging reflected light onto detectors in scanning mechanisms. Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was made to have a rotatable mirror and spinning polygon mirror in order to scan a tooth along an axis and to image the reflected light from the tooth onto the imaging detector.

19. **Claims 12, 16-18 and 20** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Wenz (US 5,440,393 A)-cited by applicant** in view of **Ernst (US 6,402,707 B1)—cited by applicant.**

As for **claim 12**, Wenz discloses everything as above (see **claim 1**). In addition, he discloses triangulation is used with strip like patterns (column 6, lines 30-36). He is silent concerning a plurality of parallel curves as the pattern. However, Ernst in a dental imager teaches using curvilinear coordinates with a variety of patterns (column 12, lines 30-45; column 16, lines 20-45). Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was made to have a plurality of curves as a pattern in order to form a three-dimensional image via a curvilinear coordinate system.

As for **claim 16**, Wenz discloses everything as above (see **claim 14**). He is silent concerning an object positioning means configured to position the object within a field of

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16,lines 20-45). Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was made to have a plurality of curves as a pattern in order to form a three-dimensional image via a curvilinear coordinate system.

20. **Claim 19** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Wenz (US 5,440,393 A)-cited by applicant** in view of **Ernst (US 6,402,707 B1)—cited by applicant** further in view of **Ozeki et al. (5,280,542)**.

As for **claim 19**, Wenz in view of Ernst discloses everything as above (see **claim 17**). Wenz is silent concerning repositioning the object to a second orientation and capturing an image at the second orientation. However, Ernst in a dental imager discloses repositioning the oral cavity several times for accurate registering of objects in the oral cavity when imaging (col. 19, lines 50-67; col. 20, lines 1-25). Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was made to reposition the oral cavity multiple times to proper register the oral cavity for imaging.

Wenz does not explicitly state merging images but horizontal and vertical images are recorded; thereby, having two positions with two strip like patterns in a horizontal and vertical direction which is similar to rastering (column 9, lines 20-30; column 11, lines 40-65). And Ozeki in an xyz coordinate measuring system teaches merging vertical image and horizontal image data to derive three dimensional coordinates (col. 10, lines 38-67; col. 11, 1-4). Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was made to merge the horizontal and vertical images in order to determine three dimensional coordinates for the three dimensional image of the cavity.

Conclusion

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Several facts have been relied upon from the personal knowledge of the examiner about which the examiner took Official Notice. Applicant must seasonably challenge well known statements and statements based on personal knowledge when they are made by the Board of Patent Appeals and Interferences. In re Selmi, 156 F.2d 96, 70 USPQ 197 (CCPA 1946); In re Fischer, 125 F.2d 725, 52 USPQ 473 (CCPA 1942). See also In re Boon, 439 F.2d 724, 169 USPQ 231 (CCPA 1971) (a challenge to the taking of judicial notice must contain adequate information or argument to create on its face a reasonable doubt regarding the circumstances justifying the judicial notice). If applicant does not seasonably traverse the well-known statement during examination, then the object of the well known statement is taken to be admitted prior art. In re Chevenard, 139 F.2d 71, 60 USPQ 239 (CCPA 1943). A seasonable challenge constitutes a demand for evidence made as soon as practicable during prosecution. Thus, applicant is charged with rebutting the well-known statement in the next reply after the Office action in which the well known statement was made.

Fax/Telephone Numbers

If the applicant wishes to send a fax dealing with either a proposed amendment or a discussion with a phone interview, then the fax should:

- 1) Contain either a statement "DRAFT" or "PROPOSED AMENDMENT" on the fax cover sheet; and
- 2) Should be unsigned by the attorney or agent.

This will ensure that it will not be entered into the case and will be forwarded to the examiner as quickly as possible.

Papers related to the application may be submitted to Group 2800 by Fax transmission. Papers should be faxed to Group 2800 via the PTO Fax machine located in Crystal Plaza 4. The

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form of such papers must conform to the notice published in the Official Gazette, 1096 OG 30 (November 15, 1989). The CP4 Fax Machine number is: (571) 273-8300

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gordon J. Stock whose telephone number is (571) 272-2431.

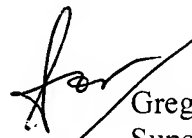
The examiner can normally be reached on Monday-Friday, 10:00 a.m. - 6:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory J. Toatley, Jr., can be reached at 571-272-2800 ext 77.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private Pair system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


gs

February 15, 2006



Gregory J. Toatley, Jr.
Supervisory Patent Examiner
Art Unit 2877



LAYLA G. LAUCHMAN
PRIMARY EXAMINER